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NOTICE OF ALLOWANCE AND FEE(S) DUE

29673 7590 07/16/2009

STEVENS & SHOWALTER LLP
7019 CORPORATE WAY
DAYTON, OH 45459-4238

EXAMINER	
AHMADI, MOHSEN	
ART UNIT	PAPER NUMBER
2812	

DATE MAILED: 07/16/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/586,621	08/18/2008	Ralf Lerner	LEO 008 PA	6530

TITLE OF INVENTION: PASSIVATION OF DEEP ISOLATING SEPARATING TRENCHES WITH SUNK COVERING LAYERS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	10/16/2009

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

29673 7590 07/16/2009

STEVENS & SHOWALTER LLP
7019 CORPORATE WAY
DAYTON, OH 45459-4238

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)

(Signature)

(Date)

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nonprovisional	NO	$1510	$300	$0	$1810	10/16/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
AHMADI, MOHSEN	2812	438-424000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☐ Issue Fee

☐ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

☐ A check is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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EXAMINER	
AHMADI, MOHSEN	
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DATE MAILED: 07/16/2009

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Interview Summary	Application No.	Applicant(s)	
	10/586,621	LERNER ET AL.	
	Examiner	Art Unit	
	MOHSEN AHMADI	2812	

All participants (applicant, applicant's representative, PTO personnel):

(1) *MOHSEN AHMADI(PTO personnel)*. (3)*Mulpuri Savitri (Primary Examiner)*.

(2) *Richard C Stevens reg#28046(app's representative)*. (4)_____.

Date of Interview: *06 July 2009*.

Type: a)☒ Telephonic b)☐ Video Conference
c)☐ Personal [copy given to: 1)☐ applicant 2)☐ applicant's representative]

Exhibit shown or demonstration conducted: d)☐ Yes e)☒ No.
If Yes, brief description: _____.

Claim(s) discussed: *1,21, 26 ,31 and 33*.

Identification of prior art discussed: *none*.

Agreement with respect to the claims f)☒ was reached. g)☐ was not reached. h)☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: *On July 06, 2009, it was agreed to amend claims 1 and 31 to incorporate the limitations of claims 21 and 33, respectively,and also to amend claim 26 and cancel claims 27-28 to place application in condition for allowance*.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Notice of Allowability	Application No.	Applicant(s)	
	10/586,621	LERNER ET AL.	
	Examiner	Art Unit	
	MOHSEN AHMADI	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *08/18/2008*.

2. ☒ The allowed claim(s) is/are *1-20,22-26,29,31-32 and 34-37*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date 07/08/2009.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *07/06/2009* .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Charles D. Garber/
Supervisory Patent Examiner, Art Unit 2812

Drawings/Examiners Comment

The drawings filed on August 08, 2008 are acceptable subject to correction of the informalities indicated as follows:

Figure 1 should be designated by a more legible legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

The line, numbers, and letters of Figures 1-4 must be durable, clean, sufficiently dense and dark, and uniformly thick and well-defined should be. See 37 CFR 1.84(l)

In order to avoid abandonment of this application, correction is required in reply to the Office action. The correction will not be held in abeyance.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Attorney Richard C. Stevens on 07/07/2007.

Cancel claims 21, 27-28 and 33.

Replace claim 1, with the following:

1. (Currently Amended) A method of forming a wafer for integrated circuits comprising low voltage elements and high voltage elements, wherein chip regions of different potentials are separated by dielectrically insulating regions formed as isolation trenches extending downward from a first planar surface, at least one of said isolation trenches receiving a material that is oxidizable in an oxygen containing atmosphere at an elevated temperature, said method comprising a sequence of process steps after forming at least two vertical insulating layers in said at least one of said isolation trenches and a horizontal insulating layer on said first planar surface to provide a second planar surface of an insulating layer above said first planar surface, said sequence comprising:

filling said at least one isolation trench with a fill material until a deepest point of an indentation in a resulting fill material layer formed on said first planar surface has a first level that is above a second level defined by said second planar surface;

performing a first planarization of said resulting fill material layer;

removing a first portion of fill material in said at least one of said isolation trenches by a first over-removal down to a defined depth not deeper than down to half of a trench depth;

removing a portion of at least the vertical insulating layers and over-removing a further portion of the fill material so as to reach a height level substantially equal with said vertical insulating layers within said at least one of said isolation trenches;

depositing at least one cap layer having a thickness extending above said first planar surface and extending downward to said vertical insulating layers and said fill

material within said at least one of said isolation trenches; and

performing a further planarization of said cap layer by one of a chemical mechanical polishing process and a resist planarization process to form a cover.

Replace claim 26, with the following:

26. (Currently Amended) A wafer for integrated circuits comprising low voltage elements and high voltage elements, wherein chip regions of different potentials are separated by dielectrically insulating regions formed as isolation trenches extending downward from a first planar surface, at least one of said isolation trenches receiving a material that is oxidizable in an oxygen containing atmosphere at an elevated temperature and two vertical insulating layers formed in said at least one of said isolation trenches and a horizontal insulating layer on said first planar surface to provide a second planar surface of an insulating layer above said first planar surface prepared by a process comprising the steps of:

filling said at least one isolation trench with a fill material until a deepest point of an indentation in a resulting fill material layer formed on said first planar surface has a first level that is above a second level defined by said second planar surface;

performing a first planarization of said resulting fill material layer;

removing a first portion of fill material in said at least one of said isolation trenches by a first over-removal down to a defined depth not deeper than down to half of a trench depth;

removing a portion of at least the vertical insulating layers and over-removing a further portion of the fill material so as to reach a height level substantially equal with said vertical insulating layers within said at least one of said isolation trenches;

depositing at least one cap layer having a thickness extending above said first planar surface and extending downward to said vertical insulating layers and said fill material within said at least one of said isolation trenches; and

performing a further planarization of said cap layer by one of a chemical mechanical polishing process and a resist planarization process to form a cover.

Replace claim 31, with the following:

31. (Currently Amended) A method of forming electric circuits, said electric circuits having integrated therein low voltage logic elements and high voltage power elements and having chip regions of different potentials being separated from one another by dielectrically insulating isolation trenches extending from a planar surface and including materials capable of oxidizing at elevated temperatures in an oxygen containing atmosphere, said method including forming insulating layers and further comprising:

filling said isolation trenches with fill material until a deepest portion of indentations of formed fill material layers are positioned above a planar surface defined by said insulating layers;

planarizing the fill material;

removing said fill material in said isolation trenches to a defined depth not deeper than down to half of a trench depth by over-etching;

etching said insulating layers and over-etching said fill material so as to obtain a substantially equal height level of said insulating layers and said fill material within said isolation trenches;

depositing at least one of a cap layer and a layer system with a thickness that extends above the level of said planar surface, said at least one of the cap layer and the layer system is an oxygen impermeable layer comprised of silicon nitride; and

planarizing said at least one of the cap layer and the layer system by at least one of a chemical mechanical polishing and a resist planarization process.

Allowable Subject Matter

Claims 1-20, 22-26, 29, 31-32 and 34-37 are allowed.

The following is an examiner's statement of reasons for allowance: The closest prior art known to the Examiner is listed on the PTO 892 forms of record.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: McNeil et al. (US Pub # 2004/0248375).

McNeil et al. teach forming at least two vertical insulating layers in at least one of isolation trenches, filling at least one isolation trench with a fill material and performing a planarization of fill material layer, but do not teach removing a first portion of fill material in at least one of isolation trenches by a first over-removal down to a defined depth not deeper than down to half of a trench depth, removing a portion of at least the vertical

insulating layers and over-removing a further portion of the fill material so as to reach a height level substantially equal with vertical insulating layers within at least one of isolation trenches and at least one of the cap layer and the layer system is an oxygen impermeable layer comprised of silicon nitride and planarizing at least one of the cap layer and the layer system by at least one of a chemical mechanical polishing and a resist planarization process.

With respect to independent claim 1, the cited prior art does not anticipate or make obvious, *inter alia,* removing a first portion of fill material in at least one of isolation trenches by a first over-removal down to a defined depth not deeper than down to half of a trench depth, removing a portion of at least the vertical insulating layers and over-removing a further portion of the fill material so as to reach a height level substantially equal with vertical insulating layers within at least one of isolation trenches, depositing at least one cap layer having a thickness extending above first planar surface and extending downward to vertical insulating layers and fill material within at least one of isolation trenches and performing a further planarization of cap layer by one of a chemical mechanical polishing process and a resist planarization process to form a cover.

With respect to independent claim 26, the cited prior art does not anticipate or make obvious, *inter alia,* removing a first portion of fill material in at least one of isolation trenches by a first over-removal down to a defined depth not deeper than down to half of a trench depth, removing a portion of at least the vertical insulating layers and

over-removing a further portion of the fill material so as to reach a height level substantially equal with vertical insulating layers within at least one of isolation trenches, depositing at least one cap layer having a thickness extending above first planar surface and extending downward to vertical insulating layers and fill material within at least one of isolation trenches and performing a further planarization of cap layer by one of a chemical mechanical polishing process and a resist planarization process to form a cover.

With respect to independent claim 31, the cited prior art does not anticipate or make obvious, *inter alia,* removing fill material in isolation trenches to a defined depth not deeper than down to half of a trench depth by over-etching, etching insulating layers and over-etching fill material so as to obtain a substantially equal height level of insulating layers and fill material within isolation trenches, depositing at least one of a cap layer and a layer system with a thickness that extends above the level of planar surface, at least one of the cap layer and the layer system is an oxygen impermeable layer comprised of silicon nitride and planarizing at least one of the cap layer and the layer system by at least one of a chemical mechanical polishing and a resist planarization process.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MOHSEN AHMADI whose telephone number is (571)272-5062. The examiner can normally be reached on Mon-Fri 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Garber can be reached on 1-571-272-2194. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. A./
Examiner, Art Unit 2812

/Charles D. Garber/
Supervisory Patent Examiner, Art Unit 2812